

Rapid Phenotypic Screening in Zebrafish: A Model for Identifying Developmental Toxicity in Native Fish Species

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Abstract

Many native fish species in Puget Sound and the Georgia Basin are exposed to anthropogenic contaminants and marine bio-toxins during early stages of development. The impacts of degraded water quality are a particular concern for at-risk stocks such as herring and Pacific salmon. However, detailed developmental investigations are difficult because precise staging and molecular tools have not been worked out for native species. Moreover, marine fish embryos are often difficult to obtain and rear under laboratory conditions. To address these logistical difficulties, we are using the zebrafish (*Danio rerio*) as a model system for rapid, high throughput phenotypic screens of fish embryos and larvae. Zebrafish are an important system for biomedical research, and there is now an array of molecular and genomic tools available for developmental studies. We are adapting phenotypic screens that were originally used to identify developmental mutants to evaluate the effects of toxins and toxicants on sensitive life history stages of teleosts. These screens fall into three categories:

- (1) Anatomical
- (2) Physiological
- (3) Behavioral

Our goal is to use zebrafish to identify specific pathways of developmental toxicity for common contaminants, and then validate the findings in native species of concern.